PERIODICAL ROOM
GENERAL LIBRARY
UNIV. OF MICH.
JAN 23 1948

The JOURNAL of GEOGRAPHY

VOLUME XLVII JANUARY, 1948 NUMBER 1

G

In This Issue

Factors Relative to Settlement in the Columbia Basin Reclamation Project . . *Chester F. Cole*

High School Geography in Nebraska . . . . . *Rex C. Miller*

Unit V. Japan . . . . *Mary Viola Phillips*

A Geographic Survey of a South-Central Indiana County . . . . . *James R. Anderson*

Magnesium—The Metal for Motion . . . . . *W. O. Blanchard*

The National Council at Work . . *A. H. Meyer*

Editorial Notes and News . . . . . .

Geographical Publications . . . . . .

Published by A. J. NYSTROM & CO., for THE NATIONAL COUNCIL OF GEOGRAPHY TEACHERS
GEORGE J. MILLER, *Editor*

A leading textbook in its field

McGraw-Hill Series in Geography

ELEMENTS OF GEOGRAPHY

By VERNOR C. FINCH and GLENN T. TREWARTHA
Professors of Geography
University of Wisconsin

Second edition. 823 pages, 6 x 9
418 illustrations. $4.75

Over 100 colleges and universities have adopted the second edition of *Elements of Geography*, because, according to teachers:

"An examination of the revised edition reveals that it is a decided improvement over the first edition, excellent though the latter was. The author's approach to and treatment of the subject is sane and their presentation is clear and convincing. There is no more authoritative text in this field."

Professor C. J. Posey, University of Kansas

"I have long thought of this book as the best one available for an introductory course in geography at the college level . . . I think Finch and Trewartha have done an excellent piece of work."

Professor Wallace W. Atwood, Clark University

"In reviewing the second edition I find it no longer necessary to send you my suggestions on how to improve this textbook. The authors have taken care of it in practically every instance, so that I am now even more pleased with this book than I was before."

Professor A. W. Kuchler, Claremont College

For teachers whose courses cover only physical geography, the publication of Part One of this text under separate cover is a real convenience—

PHYSICAL ELEMENTS OF GEOGRAPHY

By Vernor C. Finch and Glenn T. Trewartha. *McGraw-Hill Series in Geography.* 641 pages, 6 x 9. 352 illustrations. $4.50.

Send for copies on approval

McGRAW-HILL BOOK COMPANY, Inc.
330 West 42nd Street **New York 18, N.Y.**

Mention the JOURNAL—It Assures Service

The JOURNAL *of* GEOGRAPHY

CONTENTS FOR JANUARY, 1948

Factors Relative to Settlement in the Columbia Basin Reclamation Project. By Chester F. Cole 1

Mr. Cole was an instructor and graduate student at the University of Nebraska last year. He is now Professor of Geography, Fresno State College, Fresno, California.

High School Geography in Nebraska. By Rex C. Miller 8

Mr. Miller was formerly at the University of Nebraska and is now doing graduate work at Clark University.

Unit V. Japan. By Mary Viola Phillips 18

Miss Phillips is head of the high school department of geography, New Kensington, Pennsylvania. For other units prepared by Miss Phillips see the JOURNAL for Sept. and Nov. 1945, Mar., Apr., and Sept., 1946, May, 1947.

A Geographic Survey of a South-Central Indiana County. By James R. Anderson 24

Mr. Anderson is an instructor in the department of geography, University of Maryland, and is continuing his work toward the doctorate.

Magnesium—The Metal for Motion. By W. O. Blanchard 31

Dr. Blanchard is a professor of geography at the University of Illinois and co-author of the college text *Economic Geography of Europe* and a frequent contributor to the JOURNAL and other geographical magazines.

The National Council at Work. By A. H. Meyer 37

Editorial Notes and News 39

Geographical Publications 40

Contents of the JOURNAL are indexed regularly in the *Educational Index to Periodicals*.
Authors alone are responsible for opinions and statements in the JOURNAL.

The JOURNAL *of* GEOGRAPHY

GEORGE J. MILLER, *Editor*
CORA P. SLETTEN, *Assistant Editor*
State Teachers College, Mankato, Minn.

Associate Editors

G. T. RENNER, Teachers College, Columbia University
R. M. BROWN, Rhode Island College of Education, Providence
E. E. LACKEY, University of Nebraska, Lincoln
EDITH P. PARKER, University of Chicago
ERNA GRASSMUCK GILLAND, California Pennsylvania
J. R. WHITAKER, George Peabody College for Teachers, Nashville, Tenn.
D. C. RIDGLEY, Clark University, Worcester, Mass.
CLYDE F. KOHN, Northwestern University

National Council of Geography Teachers
THOMAS F. BARTON, *President*, Indiana University, Bloomington
CLYDE F. KOHN, *Secretary*, Northwestern University, Evanston, Illinois

---

SUBSCRIPTION TERMS

The subscription price is $3.00 a year, payable in advance. The price of single copies is 35 cents. Postage prepaid on subscriptions from the United States, Canada, Canal Zone, Republic of Panama, Puerto Rico, Cuba, Virgin Islands of the United States, Dominican Republic, Philippines, Guam, Samoan Islands, Hawaii, Mexico, Costa Rica, Guatemala, Nicaragua, Republic of Honduras, Salvador, Argentina, Bolivia, Brazil, Colombia, Ecuador, Paraguay, Peru, Uruguay, Spain and Spanish Colonies. All other countries in the Postal Union add for postage 27¢ on annual subscriptions (total $3.27), on single copies 3¢ (total 38¢). All subscriptions are payable in United States Dollars.

***The Journal* is the official organ of the National Council of Geography Teachers and is sent to all members of the organization. The annual dues, $3.00, are payable to the *Journal of Geography*.** Extra postage rates for copies sent to foreign countries should be added to the membership dues.

Patrons are requested to make all remittances payable to the *Journal of Geography*, in postal or express money orders or bank drafts.

Members and subscribers who wish to continue receiving the *Journal* must send remittances promptly to assure the volume being complete.

Send manuscript and books for notice or review to the *Editor*.
Send orders for back numbers to *Journal of Geography*.

Published monthly except June, July and August

PUBLICATION OFFICES: 450-454 AHNAIP STREET, MENASHA, WISCONSIN

Business Correspondence, Membership Dues, and Subscriptions may be sent to Publication office or to

A. J. NYSTROM AND COMPANY
PUBLISHERS, JOURNAL OF GEOGRAPHY
3333 ELSTON AVENUE, CHICAGO 18

Entered as second-class matter January 15, 1919 at the post office of Menasha, Wisconsin under the Act of March 3, 1879.

The JOURNAL *of* GEOGRAPHY

Copyright, 1948, by the National Council of Geography Teachers

VOLUME XLVII JANUARY, 1948 NUMBER 1

FACTORS RELATIVE TO SETTLEMENT IN THE COLUMBIA BASIN RECLAMATION PROJECT

CHESTER F. COLE
University of Nebraska

The Columbia Basin Reclamation Project is located, approximately in the south central part of the State of Washington, in the big bend of the Columbia River, and is roughly 60 miles east to west and 85 miles north to south. The irrigable area begins some 50 miles from the well-known Coulee Dam. The project lies within a 2,500,000 acre expanse, of which 1,029,000 have been classified as arable. The irrigation system, now under construction, is designed to serve this area of more than 1,000,000 acres. Coulee Dam, upon which construction began in 1933 is the key to irrigation of the area.

The maximum flow of the Columbia, which continues thru the summer months, assures water availability during the growing season. At Coulee Dam the water will be lifted from Lake Roosevelt, the 151 mile waterway formed by the Grand Coulee Dam, into the equalizing reservoir, which will be a new reservoir created in the Upper Grand Coulee,—the abandoned, ice-age bed of the Columbia. Two new earth-rock dams, 27 miles apart, will block the ends of the upper Grand Coulee to impound the water in the equalizing reservoir. Ordinarily pumping from Lake Roosevelt to the reservoir will be against a 280 ft. head—a full lake to a full reservoir. From the new equalizing reservoir irrigation water will flow thru 4,000 miles of canals, siphons, tunnels and other distributing structures to reach 12,000 to 15,000 family-size farm units.

At the present time construction is progressing, but undoubtedly it will be 25 to 50 years before the project is completed and settled, depending upon need, Congressional appropriations, governmental regulations, availability of labor and materials, and availability of settlers. Coulee Dam, itself, for all practical purposes has

been completed. Construction is progressing slowly on the pumping plant. The first pump is to be installed sometime in 1948. It will be about four or five years, before irrigation water, pumped from Lake Roosevelt, will be available for the first land in the basin. It is planned, however, that an auxiliary pumping plant, about

Fig. 1. Location of Grand Coulee Project.

twelve miles northwest of Pasco, near the southerly end of the project, will be serving 5,400 acres with irrigation water in 1947-48.

Construction has begun on the 10,000-foot South Dam, which will block the south end of the upper Grand Coulee, and contracts have been granted for building the Long Lake Dam and the 3½-mile Potholes Dam. The Potholes Dam, fourth largest in the nation, will cost $9,000,000. The Potholes Reservoir will capture seepage and return flow, thus keeping pumping costs at Coulee Dam to a minimum. This reservoir will be capable of serving 270,000 acres.

In the Columbia basin project we have the world's largest concrete dam, potentially one of the world's largest irrigation projects, and potentially the world's largest hydro-electric plant. It goes, almost without saying, that to make such an irrigation project economical to the operators of small farms, subsidy of some

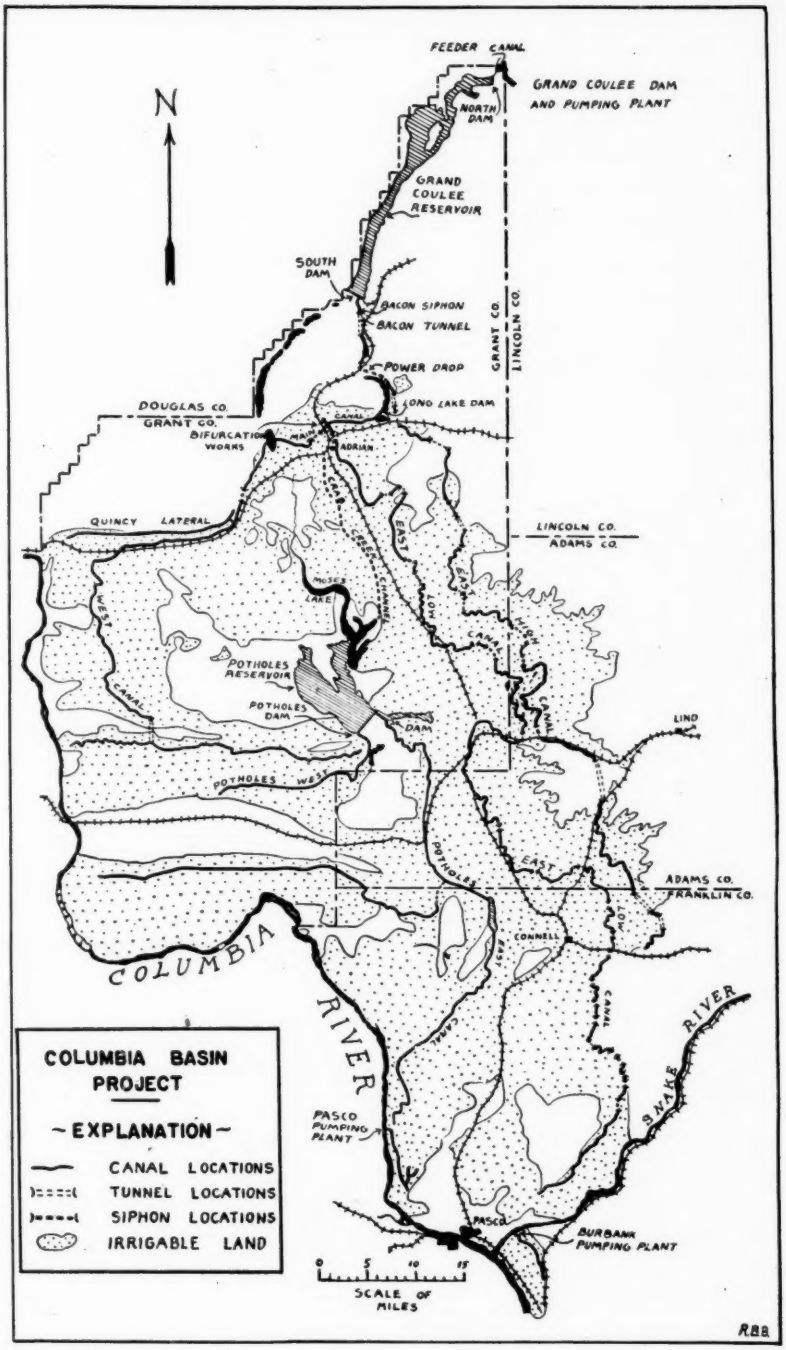


Fig. 2. Map of the Columbia Basin Project.

type is necessary. In this case agriculture will be subsidized by the sale of power.

Characteristics of the natural landscape are favorable for success of the project. The elevation ranges from over 1,500 feet above sea level at the northern edge of the project to 500 feet above sea level at the junction of the Columbia and Snake rivers, thus, gavity flow is permitted from the equalizing reservoir—elevation 1,570 ft. —thruout the project. Nearly 1½ million acres in the basin will not receive water due to poor soil, steep slope, altitude, poor drainage, etc.

The soils within the project vary widely—from deep, fine loess and alluvial deposits of good quality to coarse sterile sand. The loess material to be irrigated is confined to a narrow strip along the eastern fringe and a small section in the northwest corner. Most of the irrigable soils, however, are alluvial deposits with depth in excess of 12 inches but usually less than 48 inches. The maximum allowable slope is 15 per cent and this only where all other conditions are highly favorable. Where serious drainage difficulties might develop, the soils have been classified as nonarable.

Climate decreed long ago that dry farming was doomed to failure in most of the Columbia Basin. There have been fine crops of dry-land wheat raised in the Grand Coulee itself, as there have in the Quincy and other areas; but these were grown during years of better than average rainfall. There have been no prolonged periods of relief from drought. Average yearly percipitation varies from less than 6 inches in the southwestern part of the area to 9½ inches on the northeast uplands, and little of this rainfall comes during the growing season. Temperatures include a January average minimum of 20° Fahrenheit and a July average maximum of 91°. The most significant difference in climatic conditions between areas of the basin is found in the average length of time between killing frosts. In the northeast this period is from 135 to 150 days while on the lower south facing slopes this period is 175 to 190 days.

Soil examination has been thorough. At least one pit 5 ft. deep was dug on each forty acres. Soil texture, soil depth, alkali concentration, stoniness, angle of slope, surface in relation to grading problems, and drainage were all considered in classifying the soils. Soil classification was necessary to determine best land use and to determine the proper allocation of water and construction charges.

Soil was classified according to the aforementioned standards. In general, Class I land was taken as sandy loam to friable clay loam of 30 or more inches in depth before encountering sand, gravel or cobble; other depth characteristics; no rock in plow zone; slope up to 5 per cent and leveling to be accomplished with a float; no drainage problem to be encountered. Class II and Class III are based on deficiencies of one or more of the above. The difference between these two latter classes is usually one of degree.

It is readily understood, that in this semi-arid country, the soil is low in active organic matter and available nitrogen; hence, in considering the crop pattern for the land, thought must be given to crops which are soil building and soil holding. In irrigable land of the type under discussion, organic matter is important not only in providing plant food, but also because of its function in increasing the water absorption and retention qualities of the land. During the early years of cropping natural deficiency in organic material requires that attention be paid to the leguminous and grass crops.

It is anticipated that the general agricultural pattern will consist of various amounts of cash field crops, as sugar beets, potatoes, and livestock enterprises. The higher the productivity of the land, the greater the emphasis on cash field crops will be; the lower the productivity of the land, the greater the emphasis on forage crops, livestock production, and associated grass crops. In a very few areas vegetable and fruit farming can be a part of the farm pattern. In no case is complete specialization of truck or fruit farming recommended.

The method or methods by which settlers will be chosen has not been determined finally as yet. Veterans' priorities must be worked out as well as general settlement qualifications. Settlement qualifications, of necessity, must be set up; for, certainly a farmer's chance of success is enhanced if he has some net worth when first occupying the land. Studies will determine these policies, probably within the near future.

Settlement in the Columbia Basin Reclamation Project will be accomplished under the Columbia Basin Anti-land Speculation Act of 1937 and the Columbia Basin Project Act of 1943. The 1937 law provided that the land be appraised at its dry land value—which was done and values established ranging from approximately $3 to $30 per acre. By law, a settler need not pay more than the appraised dry-land value. The 1937 law also provided that a man

and wife could own only 80 acres together or forty acres for each, regardless of soil characteristics and other conditions. Studies made indicated that this method might not result in the most efficient land and water use, and in some cases it would not provide a suitable standard of living for a farm family. The law of 1943 changes this and provides that the land will be divided into farm units of such size as will support an average-size family at a suitable standard of living. The maximum amount of irrigated land to be owned by one family (which includes the man, wife, and children under 18 years of age) may not exceed 160 acres. Farms must conform to approved farm-unit patterns. Water will not be supplied to more than one farm unit held by any one landowner except where ownership remains the same as prior to 1937. These owners can retain up to a maximum of 160 irrigable acres as their entire farmstead, altho the area actually may consist of more than one family-size unit. In no event can a man receive water for more than 160 acres.

Farm units for persons who acquire land in the Basin subsequent to 1937 will, on the average, be considerably smaller than 160 acres. Investigations have been made as to farm size and unit types. Some of the units will be set up on the plan of rectangular subdivision; and where topographic characteristics warrant, they will be based on a contour division. Most efficient land and water use will determine the method to be employed in a given locality.

Farm size recommendations were based on the previously mentioned soil classification. The investigators recommended that for Class I land farm sizes be between 45 and 65 acres; for Class II farm sizes be between 50 and 110 acres depending upon characteristics of soil and topography; Class III farm sizes be between 110 and 160 acres. Since few, if any, farms will be of one land classification, farms will be smaller than 160 acres; size will be determined by a method of prorating acreage according to the various land classifications contained within the farm unit.

Ownership does not preclude the individual farmer leasing available land. It is desirable that the incentive for capital expansion be present; this is cared for by the lease provision.

The cost of water, the cost of bringing the water to the individual farm units is an expense, that with the original cost of the land and the cost of preparation for tillage must be added to the list of expected expenses which the prospective farmer must be prepared to meet.

Water will be allotted to land on the basis of a water duty classification of four divisions. These classifications are based on the ability of the land to produce and upon the need of the land for crop types based on this ability. It has been recommended that water be allotted on a basis less than that required for maximum production but sufficient to prevent crop failure with efficient use. If the farmer, however, desires more water, it can be obtained for a small additional charge. Successively higher charges will be assessed for abnormally high demands so that wastage of water will be discouraged. At present it has been recommended that the water allotment be between 3.25 acre feet to 5.00 acre feet, depending upon the water use classification—actually, an average of 3.664 acre feet. It is estimated that the charges for operating and maintaining the irrigation system will average $2.60 per acre per year. Added to this will be the construction-cost charge, which is expected to average $2.13 per acre per year.

Construction charges are to be prorated by productive capacity of the lands. This charge averages $85 per acre, and would be considerably higher if it were not for the fact that more than three-fourths of the actual construction costs are to be met by the sale of power generated at Grand Coulee Dam. Repayment of this charge is to be spread over a period of 40 years, there being no payment of this sort due during a development period—the first ten years after water becomes available to a particular block of land. Payments during the next 40 years, following the development period will be interest free.

In effect, the construction charge is the chief item in the cost of the land. Cost for preparing land for cultivation will depend upon such variables as slope of land, the amount of sage brush clearing necessary, difficulty in preparing ditches, availability of materials and labor, including labor within the family. This cost may have as wide a variation as from $10 to $45 per acre. Along with these variables are such considerations as the cooperative use of heavy farm equipment, cooperative systems of domestic water supply, etc.

The question that very definitely is not settled is the type and possibility of cooperative communities. Certainly, there may be savings by cooperative buying and selling. It is also possible that this pattern of life can be expanded into the cooperative community instead of the widely spread, highly individualized farm units.

The Columbia basin project offers aggressive, farm-loving people with limited means a chance to establish and maintain their own homes and to earn a steady living by tilling the soil. Such settlers will have the benefit of the most comprehensive investigations ever made on an irrigation project. The government will have provided much in the way of information, physical structures, scientific aids, and competent guidance; yet, the first few years will be hard. It will be a type of pioneering, but those with ambition, and intelligence, can be successful and provide all of the necessities and some of the luxuries for themselves and their families.

HIGH SCHOOL GEOGRAPHY IN NEBRASKA

Rex C. Miller
University of Nebraska

In contrast to a decade ago, when many geographers were busy giving reasons why geography should be added to the high school curriculum, today, many geographers are concerned about the way geography is being offered in the curriculum and what can be done to improve the instruction of the subject. Papers on the status of geography in various states have been presented in the past, to this list may now be added Nebraska.

Geography today has become more than a few facts and places to be presented and learned in the classroom and later to be forgotten. It now enters into our every day life to such an extent that we can not forget it—the radio, the newspaper and daily conversation hinge to geography directly or indirectly.

One can safely say that World War II did much to bring about this change. Before 1941 the man on the street generally knew a few geographical facts concerning his immediate environment but there his geographical thinking usually stopped. At the outbreak of the war and during the months which followed, individuals of all ages became geography minded. Strange place names entered the news each day. Where were Palermo, Bougainville, Dakar, Leyte, Corregidor, Guadalcanal and hundreds of other places never before heard of by many people? What climatic condition were their loved ones experiencing in these new surroundings? What strange types of peoples were living in these far-away lands? What were their

customs? Many maps and atlases were dusted off and used continually as the war progressed, old geography books and magazines were read thru again and again by the geography conscious population. The government itself placed heavy emphasis on many branches of geography. Cartographers, meteorologists and specialists in nearly all fields of geography and related fields were called to government service in Washington, D.C. Many college and university instructors spent their war years doing special teaching in the armed forces.

The present situation may be stated thus; the people of the United States are definitely geographical minded, more than ever before they see the urgent need of geographical knowledge for the air age which is upon us. The great challenge is here for all geographers and the big questions are—can we meet the challenge successfully? Will our position be strengthened? May extensive gains be expected in the immediate future?

THE GEOGRAPHICAL SURVEY

The present survey of geography in the high schools of Nebraska includes material for the two school years of 1945-46 and 1946-47 with some supplementary material from previous years. The writer used two sources of material for his study; first, the yearly records and teaching programs of the individual geography teachers,[1] and secondly, material gleaned from a questionnaire sent to the individual geography teachers in the high schools of Nebraska.

THE GROWTH OF GEOGRAPHY IN NEBRASKA HIGH SCHOOLS

In 1943 the State Department of Education of Nebraska, for the first time, placed World Geography on the list of preferred subjects for the high schools of Nebraska. It was suggested that World Geography be taught in the first year of high school.

In 1942-43 geography was taught in eighty-one high schools in Nebraska (Table I). In 1943-44 the number increased to ninety-five which was a seventeen per cent gain. The next year, 1944-45, the increase was still greater with 133 schools offering high school geography or a gain of thirty-eight per cent over the preceding year. In 1945-46 it rose to a total of 240 schools or a gain of eighty-

[1] From the files of the registrar, George W. Rosenlof, University of Nebraska. Yearly reports sent in by school superintendents.

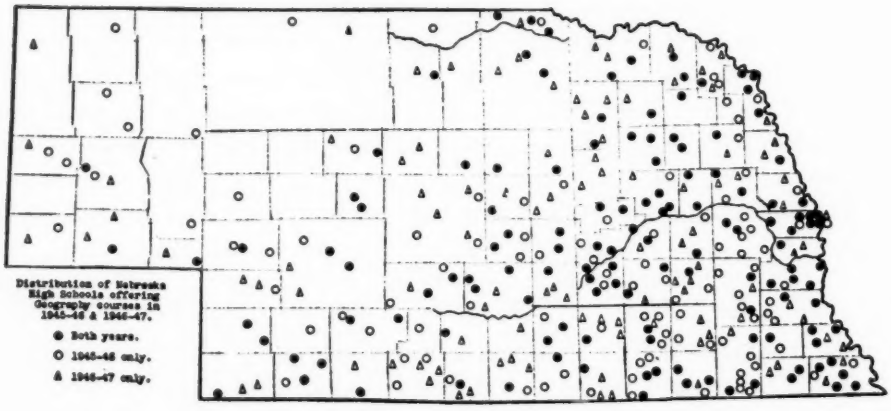
TABLE I. INCREASE IN GEOGRAPHY FROM 1942-1947

Year	*Number of Schools*
1942-43	81
1943-44	95
1944-45	133
1945-46	240
1946-47	240

one per cent. Thus in a three year period 1943-46 geography offerings increased about sixty-seven per cent. During the last year, 1946-47, the number showed no increase but remained at 240 schools.

In comparing the schools offering geography during the two years 1945-46 and 1946-47 the writer found that 133 schools offered geography both years, 107 high schools offered geography in 1945-46 but not in 1946-47, and 107 high schools offered geography in 1946-47 but not in 1945-46. Consequently, a total of 347 schools offered courses in geography one or both of the last two years.

During 1945-47 there were 530 city and village high schools in session in the state. This means that sixty-five per cent of the high



schools of Nebraska had classes in geography sometime during the last two years. The areal distribution of schools offering courses in high school geography is shown on the Nebraska map (Fig. 1).

THE NATURE OF THE GEOGRAPHY COURSES

The most prominent geography course taught in the Nebraska high schools is World Geography (Table II), with 199 high schools offering such a course in 1945-46 and 215 offering it in 1946-47. Over eight times as many classes of World Geography were offered

TABLE II. GEOGRAPHY COURSES TAUGHT

Type	*Number of Schools* 1945–46	1946–47
World Geography	199	215
Economic Geography	25	18
Industrial Geography	7	2
Commercial Geography	6	2
Physical Geography	0	2
Geography of Latin America	0	1
Unknown	3	0
	240	240

than Economic Geography, its nearest rival. Undoubtedly the recommendation of the State Department of Education has been a major factor in the growth of this course.

Economic Geography courses rate second in number with twenty-five schools offering such courses in 1945-46 but only eighteen in 1946-47. In 1945-46 there were also more schools teaching Industrial and Commercial Geography courses than in 1946-47. Two new courses made their appearance in 1946-47, namely Physical Geography and the Geography of Latin America. Two schools taught the former course and one the latter.

The majority of the courses in World Geography were taught in the ninth and tenth grades while the courses in Industrial, Commercial and Economic Geography were offered in the higher grades. No schools offered two geography courses at the same time, however, several schools did offer two different courses during a one year period each being taught for one semester.

The full year or two semester course was recommended by the State Department of Education. In 1945-46 158 high schools or sixty-six per cent taught full year courses (Table III). In 1946-47 this number had increased to 182 or seventy-six per cent of the total high schools offering geography. It was found that many of the one semester geography courses were alternated with history

TABLE III. LENGTH OF COURSES

Number of Weeks	*Number of Schools* 1945–46	1946–47
36	158	182
18	78	56
Unknown	4	2
	240	240

TABLE IV. GRADES IN WHICH GEOGRAPHY IS TAUGHT

Grades	*Number of Schools*	
	1945–46	*1946–47*
9 only	76	80
9 and 10	71	70
10 only	16	18
10 and 11	10	7
11 only	3	5
11 and 12	24	26
12 only	7	8
10 and 12	3	0
10, 11, 12	11	8
All grades	17	14
Unknown	2	4
	240	240

courses. Other schools had one semester of geography succeeded by a semester of economics or agriculture.

There has been a steady increase in the teaching of geography in the ninth and tenth grades (Table IV). In 1946-47 168 schools or seventy per cent of the total number of high schools offered courses in these grades, forty-three schools or eighteen per cent offered courses in the eleventh and twelfth grades, and twenty-nine schools or twelve per cent had other combinations of grades taking geography. Small schools usually are responsible for such combinations of grades. This increase of geography in the ninth and tenth grades in Nebraska is a reverse of the conditions found in Arkansas[2] and Missouri[3] where a large percentage of the geography was taught in the eleventh and twelfth grades.

The size of geography classes varied widely (Table V). It was

TABLE V. SIZE OF GEOGRAPHY ENROLMENT IN HIGH SCHOOLS

Number Enroled	*Number of Schools*
1-10	37
11-20	102
21-30	60
31-40	20
41-50	7
51-100	3
100 and Over	3
Unknown	8
	240

[2] Collier, James E., "Geography In The High Schools of Arkansas," THE JOURNAL OF GEOGRAPHY, Vol. 42, April, 1943, p. 134.

[3] Odell, Clarence Burt, and White, Leslie Wood, "The Status of Geography in the High Schools of Missouri," THE JOURNAL OF GEOGRAPHY, Vol. 41, February, 1942, p. 41.

found that 199 high schools or eighty-three per cent had class enrollments of thirty or fewer students. Only six schools or less than three per cent had enrollments over fifty students. One school had an enrollment of four hundred students with numerous sections being offered. But on the whole, it was evident that many of the larger high schools over the state failed to offer any geography courses above the seventh grade.

TRAINING OF TEACHERS

Considerable time was spent by the writer in checking the preparation of those who were teaching high school geography. The results were astonishing and revealed one of the greatest weaknesses in the geography field (Table VI). Of the 240 persons teaching geography, ninety-eight had had no college courses in geography and thirty-one had two hours or less. This is a total of 129 teachers or fifty-four per cent who had less than one semester of college preparation in the subjects they were teaching. Thirty-three teachers or about fourteen per cent of the total number of geography teachers had over ten hours of college work or the equivalent of a minor in geography. Therefore, if we assume that ten college hours in geography are needed by a teacher to be prepared to teach geography effectively, only about fourteen per cent were prepared for their jobs. Many of the teachers having only a few hours of training have received their credit by extension work or possibly thru summer school courses.

TABLE VI. TRAINING OF GEOGRAPHY TEACHERS IN NEBRASKA

College Work	*Number of Teachers*
None	98
1–2 hours	31
3 hours (1 semester)	17
4–5 hours	14
6 hours (2 semesters)	15
9 hours (3 semesters)	12
10–16 hours (Minor)	23
17–24 hours (Major)	7
25 or more hours (Masters)	3
Unknown	20
	240

By checking the major field of preparation of those persons teaching geography, it was found that the largest number was from the field of English with history coming second (Table VII). Nearly every field of university study was represented among the major

but only three geography majors were among those teaching geography in the high schools of Nebraska.

Most of the teachers having three or more hours of college credit in geography received their training from one of the four State Teachers Colleges of Nebraska (Kearney, Wayne, Chadron or

TABLE VIII. MAJOR FIELD OF THOSE TEACHING GEOGRAPHY IN NEBRASKA

Major Field	*Number of Teachers*
English	55
History	43
Social Studies	26
Mathematics	14
Foreign Language	13
Educational Administration	13
Music	7
Biology	6
Home Economics	6
Commercial	4
Geography	3

Following each had 3:

Physical Education, Art, Speech, Sociology, Chemistry, Philosophy and Economics.
Unknown: 29

Peru), the University of Nebraska, or Nebraska Wesleyan University. A few received their credit from other state universities and other normal schools.

NEEDS AS EXPRESSED BY TEACHERS

Educational leaders can always assume or guess what is needed in high school teaching but it is always interesting and valuable to have the teacher speak for himself. Questionnaires were sent to high school geography teachers thruout the state. These questionnaires went to large schools and small schools, to well qualified teachers and those having no training, and to high schools in densely settled eastern Nebraska and sparsely settled western Nebraska.

The questionnaire dealt with such critical factors as the following: the teacher's idea on the need for college preparatory courses, the equipment on hand in their local schools, the need for field trips and laboratory periods, the phases of geography most interesting to the students, the question of geography as a required subject in the high school, the grades in which geography should be taught, the textbooks used in the local high school, and the request for suggestions as to the needs of geography as it is taught in the high school today.

The teachers agreed unanimously that college preparatory

courses for the teacher were necessary to make the subject alive and interesting to the students. Discouragement ran high among those teachers who had had no training. Numerous teachers reported they were teaching the geography course simply because they had the time open for it in their teaching program and no other teacher had the time. Much criticism was placed on the school administrators, many of whom had not really welcomed geography into the curriculum.

The majority of the teachers reported that they had good equipment in their schools, that is at least one good globe, one set of wall maps, an atlas and six or more good reference books. Several schools reported subscriptions to the *National Geographic Magazine* and some reported motion picture and slide projectors in their equipment. There was a close correlation between better trained teachers and better equipment. Fortunate indeed is the school which has both. In evaluating this equipment, it should be remembered that the subject is comparatively new in the curriculum and the amount and quality of the equipment should improve with time.

All teachers agreed that both field trips and laboratory work were desirable and would add much to the value and interest in geography, but only a small percentage of the high schools offered field trips or laboratory courses. Reasons given for this neglect were the shortage of time and the over crowded teaching program that afflicts most schools. Altho not mentioned, the poorly trained teacher would not know how to prepare and conduct such field trips.

The most popular phases of geography work listed by students' preference are the following: first in favor was human geography, that is how and why different peoples live as they do; other popular phases were map studies; comparison studies involving the United States and foreign countries; current events, that is, world affairs tied up with World Geography; and climatic studies and a survey of world occupation. Those teachers having field and laboratory work reported that these were the most popular phases of the course.

All but two teachers thought geography should be a required subject in all high schools. Several teachers thought geography should hold as important a position in the high school curriculum as history, English and mathematics. There was a general consensus that it should be taught in the ninth and tenth grades if only one course was to be offered, and that more advanced courses

should be offered in the eleventh and twelfth grades. The suggestion was made by one teacher that World Geography be offered in the lower grades of high school and Economic Geography be offered in the higher grades. Advanced courses were in high favor but it was thought that the probable small enrollments would not warrant their being offered as elective courses.

Within the present framework about the best the high school teachers can do is to promote a general understanding of geography, to teach the pupils to think geographically and instill a lifelong interest in the subject. To accomplish these objectives the teacher must be well trained in subject matter and in the best possible techniques having adequate equipment and many fine personal qualities.

One of the greatest needs today is that of more and better textbooks for the high school level. At present, the three most used texts in considering the crop pattern for the land, thought must be given H. Bradley, *Global Geography* by Van Cleff, and *Modern World Geography* by Case and Bergsmark. Other texts used are:

1. *The Nations Today* by Packard-Sinnott-Overton.
2. *World Geography* by Faigle and Thurston.
3. *Human Geography in the Air Age* by Renner.
4. *Our Air Age World* by Packard and Overton.
5. *Economic Geography* by Colby and Foster.
6. *The Working World* by Whitbeck, Finch and Durand.

This is not a complete list but it does include the nine text books in geography most often named for use in the high schools of Nebraska.

A few teachers made their own outlines for study, and used a number of books as references, with magazines and pamphlets for additional study. About fifty per cent of the teachers used workbooks, altho most of them suggested that workbooks had their disadvantages. It seems that the workbook is most useful to the slower students, the map work being especially helpful.

Perhaps the most valuable information gleaned from these questionnaires was the teacher's suggestions for better teaching of geography. These teachers have been in direct contact with high school students so they should be well qualified to assess the needs for the advancement of geography. These suggestions are stated in order of their importance:

1. Better trained teachers.
2. More and better equipment.

3. More time for field trips and laboratory periods.
4. Better cooperation from school administrative personnel.
5. A tentative state course of study in high school geography so as to unify the attack on the subject.
6. More visual aids of the right type for the high school level.
7. Additional courses should follow the introductory course.
8. A list of available supplementary material and where this material may be obtained.

SUMMARY

Geography has gained in popularity in Nebraska during the last decade. This is evident by the steady gain in the number of high schools offering the subject, eighty-one schools in 1942-43 and 240 schools in 1946-47. During the last two school years 347 high schools or sixty-five per cent of the total high schools in operation in Nebraska had classes in geography.

World Geography is the principal course taught in Nebraska high schools. This course is taught primarily in the ninth and tenth grades. About seventy-six per cent of the high schools in Nebraska have a two-semester course, but in only a few high schools is more than one course being offered.

Many small high schools thruout the state have courses in geography, but there is a surprising lack of geography in the larger high schools of the state.

The academic preparation of teachers is the greatest problem in the teaching of geography in Nebraska. Eighty per cent of those teaching geography in high schools have not had sufficient preparation for teaching the subject. Fifty-four per cent of the total number have less than three college credits, and forty per cent have had no training in the subject at all.

Individuals trained in the field of geography are aware of the tremendous significance of geographic thinking today. Many responsible people are alert to the critical needs for more and better geography; some progress is being made but much is still to be done.

However in Nebraska the vicious cycle is at least partially broken. In college, students did not take geography to prepare themselves to be high school teachers because not enough geography was offered in the high schools. Now that geography is offered, more and better prospective teachers will train themselves in the subject.

UNIT V. JAPAN

MARY VIOLA PHILLIPS
New Kensington, Pennsylvania, High School

I. OVERVIEW

Japan is much in the eyes of the world at present. No adequate understanding of Japan and the social, political and economic changes that are taking place within the country is possible without a consideration of its geography. The location, climate, natural resources and their distribution, stages of industrial development, habits, religion and customs of the people are basic understandings, prerequisite to an intelligent appreciation and interpretation of and to attempted solution of its national and international problems.

This detailed study of the country will furnish the students with geographic facts which can be used as an aid in understanding and interpreting past and present events. They will be better able to analyze current problems in Japan and arrive at conclusions that are sound.

II. OUTLINE

A. Location—Geographical Significance
  1. Range of latitude and longitude
    a. Compared with British Isles
    b. Compared with United States
  2. Location in respect to Pacific Ocean
    a. Influence of insular position
      (1) In past military activities
      (2) On people and ideas
      (3) On development of industries
  3. Location in respect to the continent of Asia
    a. Influence of three land areas of the continent which project toward Japan
    b. Japan's position in respect to Asia compared with England's position in respect to Europe—desire for buffer states
  4. Location in respect to the United States
    a. In terms of naval power
    b. In terms of air power

B. Physical Framework of the Country
  1. Plains—Kwanto, Mino Owari, Ishihari, Echigo
  2. Mountains—Two-thirds of land area
  3. Alluvial valleys
  4. Volcanic and Seismic Activity
  5. Nature of Coastline

C. Climate—Type of
  1. Factors controlling the type of climate
    a. Monsoon
    b. Latitudinal position
    c. Surrounding waters
    d. Ocean currents

2. Violent winds—typhoons—frequency

D. The Native Vegetation
   1. Abundant rainfall, varied relief and great latitudinal extent reflects a luxuriant and diversified vegetation
      a. Sakhalin—vast forest areas of conifers
      b. Hokkaido—deciduous broad leaves and conifers
      c. Honshu—northern in character—deciduous and evergreen intermixed
      d. Shikoku and Kyushu—semi-tropical and few tropical, bamboo forests widespread in lowlands

E. Population—Density of
   1. Ethnic mixture of Korean, Ainu, and Malayan stock—personal characteristics
   2. Religion of people and philosophy of life
      a. Effect of religion of people
      b. Effect of religion on rest of world
   3. Types of homes—attitude toward home and family
   4. Educational system—attitude toward learning
   5. Inventiveness—proof of this
   6. Social customs

F. Rapid Development to Dominant Power
   1. Natural conditions which assisted the people in this restricted area to win and hold a place as a world power
   2. Changes brought about by spread of western ideas
   3. Major problems brought on by rapid development

G. Natural Conditions which Favored Japan's Development Industrially and Commercially
   1. Power resources and access to resources
   2. Location favorable for world trade
   3. Labor supply and capital—climate favorable for regular and sustained labor
   4. Transportation facilities
   5. Favorable coastline

H. Types of Manufacturing Industries Japan had Developed before World War II
   1. Textile industries—silk, cotton, rayon
      a. Source of raw materials
      b. Centers of manufacture
      c. Amount exported
      d. Reason for rapid development
   2. Iron and steel industry
      a. Source of iron ore
      b. Iron and steel centers
      c. Reasons for desire to develop iron and steel industry
   3. Shipbuilding
      a. Need of ships
      b. Source of materials
      c. Shipbuilding centers
   4. Manufacture of paper
      a. Raw materials
      b. Water resources
      c. Importance of

I. Agriculture Development
   1. Conditions favorable to agriculture
   2. Conditions unfavorable—how overcome
   3. Leading crops
   4. Self sufficient in 1937—Steady decrease after outbreak of war

J. Fishing Industry
  1. Natural conditions favoring industry
  2. Conditions on land which forced Japanese to fishing
  3. Kind of fish caught
  4. How fishing industry helped the Japanese in preparation for war

K. Japan's Industries Today
  1. Changes brought about by war
  2. Deterioration in the position of Japan as a world power
  3. Future possibilities

L. Japanese Aggression
  1. Reasons for Japan's desire for more territory
    a. Problem of overpopulation
    b. Need of raw materials
    c. Need of markets
    d. Belief that all Asiatics should be united under one political leadership
    e. Possession of lands considered essential to defense
    f. Desire for complete economic and political control over the source of raw materials that made its industries possible
  2. History of empire acquired between 1875 and 1942
    a. Kurile Islands, Bonin and Ryukyu Islands
      (1) When and how secured
      (2) Location and description of islands
      (3) Valuable fishing grounds
      (4) Increased arc of Japanese naval control of western Pacific
    b. Taiwan (Formosa)
      (1) When and how secured
      (2) Description of land, its resources and its people
      (3) Products and industries
      (4) Development carried on by Japan
      (5) Rich source of tropical raw materials
      (6) Excellent base
    c. Kwantung Peninsula in Southern Manchuria
      (1) When and how secured
      (2) Value
    d. Korea (Chosen)
      (1) When secured by Japan
      (2) Location created desire for buffer state
      (3) Conditions in Korea that made possible Japan taking control
      (4) Attitude of Koreans toward Japan
      (5) Koreans—homes, customs
      (6) Agricultural and mineral resources
      (7) Ice free harbors
      (8) Activities of Japan in Korea
      (9) Changes brought about by the war
    e. Micronesia (Marianas, Marshalls, and Carolines)
      (1) When and how secured
      (2) Importance of location
      (2) Area covered
      (4) Resources
      (5) Development carried on by Japan
      (6) Means of extending naval control over the whole of western Pacific Ocean
    f. District of Tsingtav
      (1) When secured

(2) Valuable location for striking at heart of China

g. Manchuria

(1) When and how secured
(2) Location in respect to Japan
(3) Description of surface
(4) Climatic conditions prevailing
(5) Products and natural resources
(6) Population—Chinese immigration
(7) Activities of Japanese

h. Other conquests

(1) Annexed Hainan and other islands of strategic importance in 1939
(2) Indo-China and Thailand by summer of 1941
(3) By summer of 1942 the Philippines had been wrested from United States, Malay Peninsula and Burma from British and East Indies from Dutch

M. Japanese Aggression Ended

1. Defeat of Japan
2. Reduced to status of minor power

N. Future Problems

1. Adjustment to geographical surroundings in a limited area
2. Economic and political reorganization
3. Reshape the nation into one that will not be a threat to peace in the future

III. Study Assignment Sheet

Unit V (Laboratory Work)
Japan

Bibliography:

Allen, G. C. *Japanese Industry: Its Recent Development and Present Condition,* Institute of Pacific Relations, New York.

Bergsmark, D. R. *Economic Geography of Asia,* Prentice Hall, Inc., New York.

Bradley, J. H. *World Geography,* Ginn and Co., New York.

Chamberlin, W. H. *Modern Japan,* Institute of Pacific Relations, New York.

Franck, H. *The Empire of Japan,* Owens.

Packard-Overton-Wood. *Our Air Age World,* The Macmillan Co., New York.

Renner, G. T. *Human Geography in the Air Age,* The Macmillan Co., New York.

Scherer, J. A. *Japan's Advance,* Hokuseido Press, 1934.

Schumpeter, E. B. *The Industrialization of Japan and Manchukuo; Population, Raw Materials and Industry,* The Macmillan Co., New York.

Stewart, M. S. *Our Neighbors Across the Pacific,* Webster Publishing Co., Missouri.

Magazines

National Geographic Magazine

Ballantine, J. W.—"I Lived on Formosa," January, 1945.

Griffs, W. E.—"Japan, Child of the World's Old Age," March, 1933.

More, W. R.—"Face of Japan," December, 1945.

Nourse, M. A.—"Women Work in Japan," January, 1938.

Patric, J.—"Friendly Journey in Japan," April, 1936.

Price, W.—"Mysterious Micronesia: Japan's Mandated Islands," April, 1936.

Weston, W.—"The Geography of Japan," July, 1921.

The Journal of Geography

Booth, A. W.—"Hainan! Stepping Stones of Japanese Imperialism," September, 1941.

Davis, D. H.—"Some Aspects of Urbanization in Japan," September, 1934.

Riggs, M.—"The Power of Japan and China," May, 1937.

Sanders, E. M.—"The Climate of Japan and Formosa," September, 1921.

Stewart, J. P.—"Japan and the Manchurian Iron Industry," October, 1933.

The Geographical Review

Jones, W. D.—"Hokkaido, the Northland of Japan," Vol. 11, 1921.

Orchard, J. E.—"The Pressure of Population in Japan," Vol. 28, 1928.

Trewartha, G. T.—"The Suwa Basin," Vol. 20, 1930.

1. Make a political map of present day Japan, a relief map, an annual rainfall map, and one showing the former chief industrial districts. Describe the physical framework of Japan.
2. Between what two ranges of latitude does Japan extend? longitude? Compare the range of latitude with United States. How does Japan resemble Great Britain in location? What are the advantages of Japan's insular position? the disadvantages?
3. Make a map showing the area controlled by Japan in 1942. Shade in a distinctive way the region captured after Pearl Harbor.
4. What are the names of the four principal islands? What island did Japan share with Russia? What is the area of present day Japan?
5. On a map of North America draw a map of east coast and use its exact range of latitude. At this latitude what type of climatic conditions would you find in northern Japan? central Japan? southern Japan?
6. Make a climatic graph showing the average monthly temperature and precipitation for the two stations which are described below.

Tokyo, Japan
35°50′ N., 139°50′ E., Altitude 90 feet

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Rainfall	2.0	2.6	4.3	5.3	5.9	6.3	5.6	4.6	7.5	7.2	4.6	2.3
Temperature	37	38	44	54	62	69	75	78	72	61	51	41

Charleston, South Carolina, U.S.A.
32°47′ N., 79°56′ W., Altitude 48 feet

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Rainfall	3.1	3.1	3.3	2.4	3.4	5.3	6.2	6.7	5.2	3.9	2.7	3.3
Temperature	49	52	57	64	72	79	81	80	65	67	58	51

7. What general statements can you make concerning the rainfall in Tokyo as compared with Charleston, South Carolina?
8. How would you characterize the summer temperature of both? The winter temperature?
9. What ocean currents influence the climate of Japan? What other factors influence the climate of Japan?
10. Under what social conditions did and do most of the people live? What is the state religion? What are the outstanding doctrines of their religion? What probably will be the effects of our occupation of Japan upon their social customs and conditions? Study the papers and list the reforms and changes that are taking place in Japan today.
11. What are the distinctive features of Japanese agriculture? What conditions are favorable? unfavorable? What are the chief crops? What are the causes for the lack of livestock? How is it possible for a densely settled country like Japan to supply nearly all its own food?
12. What natural factors have aided in the great importance of fisheries? Where could their fishing vessels be found? Why is Japan's diet so largely limited to rice and fish?
13. What natural conditions favored Japan's development industrially and commercially? What types of the manufacturing industry did Japan develop? What materials were bought to supply its industrial centers and from what countries of the world? What

conditions made it possible for people of Japan to work for comparatively low wages? Where did Japan get the minerals to produce its war materials?

14. When did Japan open its doors to world trade? How did Japan rank in the commercial world? What were five of its leading imports? exports? What are its future possibilities?
15. Why was Japan able to rise from an isolated unknown nation to the rank of a first-class power? List the methods Japan used to modernize itself.
16. What are three things a nation can do when it becomes over-populated? Which line of action did Japan follow?
17. Discuss Japan's mainland policy. What did Japan gain from wars with China and Russia?
18. In the chart below list the areas Japan acquired between 1875 and 1942. Tell when and how they were acquired. List the chief resources of each area.

Areas	When	How	Resources Gained

19. Why did Japan assume control of Korea? Why was Taiwan a valuable colony?
20. Why were the Japanese anxious to gain and retain control of Manchuria?
21. What sections of China proper did Japan gain control of? Why?
22. What Pacific islands were given to Japan as mandates after World War I?
23. Summarize how Japan's colonies and dependencies were important factors to it as a world power.
24. What geographical patterns of expansion did Japan follow before the coming of the age of air power? What ideas for expansion did Japan follow after becoming aware of air power?
25. Draw a map showing the Japanese geography of the Pacific based upon air power.
26. Find the great circle air line distances between Tokyo and the following cities of the world. What time would it be in each city if it were 2 A.M. in Tokyo?

Cities	Distance	Time
New York		
Chicago		
Chungking		
Manila		
Calcutta		
Moscow		
Cairo		
Honolulu		
London		
Singapore		
San Francisco		
Mexico City		
Sydney		
Panama		
Juneau		

27. What are the strategic points lying directly between United States and Japan in the Pacific?
28. Show that issues and situations that have caused most of our wars are geographical.

Terms to identify

acquisition	mainland policy
aggression	mandated
atoll	marginal
commodity	middle latitudes
concentric	monopoly
deeps	monsoon
geopolitical	Occidental
humid subtropical	Oriental
humid continental	seismic
imperialistic	Shintoism
insular	strategic
lagoon	subsistence
leeward	Taiwan
low altitude	typhoon

Other Activities

1. Make a collection of newspaper clippings, maps and current topics showing the activities of the United States in Japan.
2. Prepare a written report on "The Activities of the Japanese in South America."

A GEOGRAPHIC SURVEY OF A SOUTH-CENTRAL INDIANA COUNTY

JAMES R. ANDERSON
University of Maryland

Morgan County, of which the county seat is Martinsville, is located near the geographic center of Indiana just southwest of Indianapolis. The nearest corner is less than fifteen miles from the city's edge. It lies midway between the 39th and 40th parallels, and the 86th and 87th meridians. It has numerous general advantages of location. It is near the present center of the nation's population; it is also near a convergence of east-west railroads and trunk highways. Important urban centers, Chicago, Detroit, St. Louis, Louisville, Columbus, Toledo, and Cincinnati are not far away. It is in a great agricultural region; also near are valuable coal fields. On the whole the location is a highly favorable one.

Several specific locational advantages are: proximity to Indianapolis, a nearby market; also, state highways 37 and 67 which pass

thru this County, carry nearly half of the traffic just south of Indianapolis. U. S. Highway 40, a coast to coast thorofare, just misses the northwest corner of the County. The location is less fortunate as to rail transportation. Only two railroads pass thru the County and neither has passenger service. However, nearby Indianapolis has excellent rail service.

THE NATURAL LANDSCAPE

One of the most significant aspects of Morgan County's location is in respect to amounts of glaciation. No other Indiana county has more glacial demarkation lines or zones. The unglaciated region extends into the southcentral part; the Illinoian stage is represented, as are both the early and late Wisconsin. This diversity makes for a variety of soils and productivity.

Topography. Morgan County may be divided into four fairly distinct areas (Fig. 1). Slightly the largest is a glacial plain which is a part of Indiana's richest agricultural area. This plain occupies a strip averaging five miles in width along the northern and eastern boundaries. It is fairly level except south of White River along the eastern border. In the northwestern part of the County is the bed of a former glacial lake. Forming the southern and western limits of the glaciated plain is the outer morainic zone of the Wisconsin Ice Age. Altho terminal morainic features are few, there is a fairly abrupt transition between the till plain and the hilly area of the south-central and southwestern parts of the County. Most of Morgan County's part of this hilly upland benefited by the deposition of an older glacial till (The Illinoian). This more badly leached and eroded till is distinctly less fertile than the area covered by the Wisconsin drift. In the central and south central portions of this relatively rough upland area are unglaciated ridges. Along the southern boundary, is the County's maximum elevation and about two square miles were unglaciated.

Crossing the County diagonally from northeast to southwest is the relatively broad fertile White River Valley which comprises approximately one-tenth of the total area of the County, and is much utilized for corn and soybean production. This valley almost equally divides both the plain and the upland into a northern and southern section. The till plain portion of the valley grades gently into the rolling uplands, but in the hilly area the valley is rather distinct. Near the western edge of the till plain, the river has cut thru relatively resistant shales, leaving prominent bluffs on both

sides of the valley to the north of Martinsville. The eastern bluffs are especially striking. This fertile valley has been of distinct importance not only as a rich agricultural area but also as an avenue for trade and transportation. The railroads and highways between

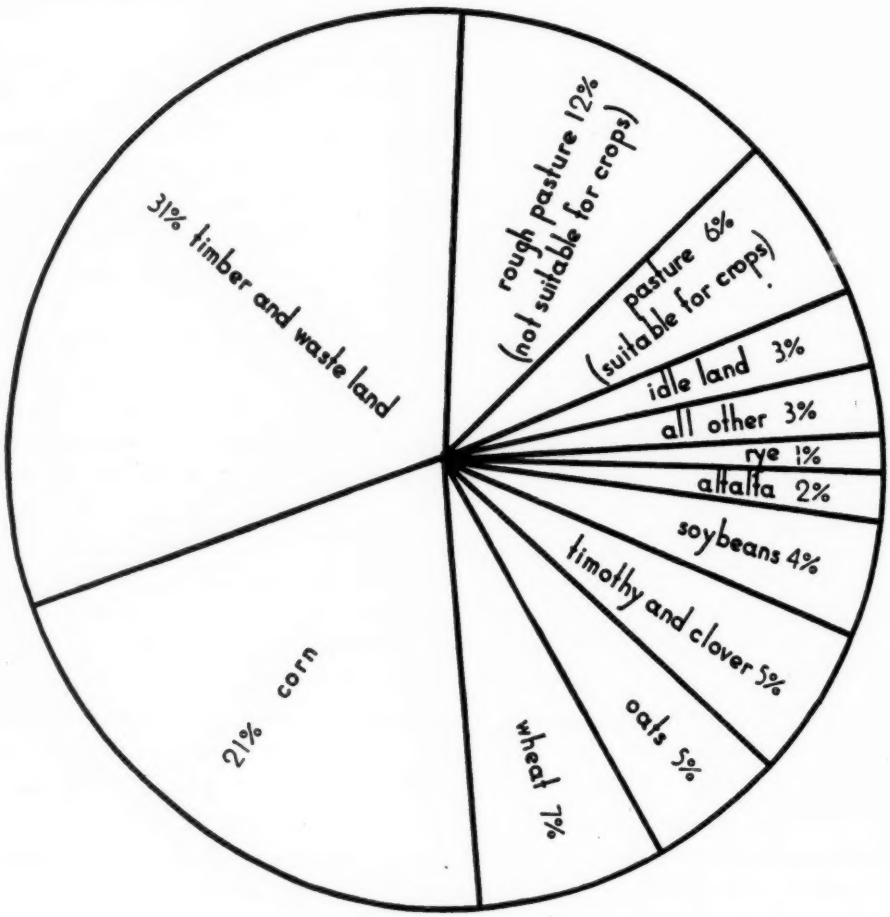


FIG. 1. Topography of Morgan County. Note the distinctly broader valley in the southwestern part of the County. This is apparently related to meltwater from the receding Wisconsin glacier.

Vincennes to the southwest and Indianapolis found it the natural route. In Morgan County the main trade routes are in the valley partly because of the rugged hill land of the western part of the County. A distinct "funnel of traffic" centers near Martinsville. White River, tho far more of an advantage than a handicap, never-

theless is subject to severe flooding, which often causes extensive damage to crops and homes.

The fourth topographic division, the Mitchell Plain, is a comparatively small non-contiguous area along the southwestern and western margins of the County. There are numerous sinkholes and one large cavern. Much of the local drainage is underground.

Drainage. The drainage of the County has a relatively simple dendritic pattern based on the West Fork of White River. Most of the County is drained by numerous creeks and "branches" whose waters reach White River within the County. There are only small poorly drained areas except the bed of the glacial lake in the northwestern corner. There artificial drainage has been carried out.

Climate. The climate of Morgan County is near the average for Indiana. The average temperature of the warmest month (July) is 76°; for the coldest month (January) it is 29°. The length of the growing season is about 175 days, approximately midway between that in the southwestern and northeastern parts of the State.

The average annual precipitation of approximately 42 inches is rather evenly distributed thruout the year, except that the spring is a little wetter than the autumn. Both droughts and floods are frequent. While droughts seldom cause total crop failure, curtailment of yield is common. Floods are most frequent in spring; fortunately for farmers in the White River Valley, they usually occur before crops are planted.

Natural Vegetation. The moderately humid climate favors deciduous hardwoods. A beech-maple forest formerly covered the northeastern part; an oak-hickory forest occupied most of the remainder. Much of the beech-maple forest has been cleared; but the rough part of the County still remains predominantly tree covered, mostly by second or third growth.

THE CULTURAL PATTERN

The production pattern of Morgan County has been one of relative uniformity thruout the past one-hundred years. Agriculture has been the dominant occupation, but manufacturing and lumbering have played prominent roles. For a quarter of a century following the Civil War, lumbering closely rivaled agriculture, but production has been steadily declining since 1900. Just as the exploitation of the hardwood forests was reaching a peak in Morgan County, manufacturing began to take on present characteristics,

with Martinsville as the center of development. Between 1890 and 1910, the period of greatest industrial growth, the clay products and the woodworking industries (furniture and cooperage) became an integral part of the industrial situation. Two other activities which have been both rather unique and significant also became well established during this twenty-year period—the goldfish industry and the commercial use of the mineral waters, both at Martinsville.

Today Morgan County remains primarily agricultural with sufficient manufacturing, principally at Martinsville and Mooresville, to contribute a sizeable part of the County's yearly income. At the 1940 census agricultural production was slightly over 2¼ million dollars, while the value of manufactured products was nearly 1¾ million. (The value added by manufacture was $900,000.) At least five times as many persons are engaged in agriculture as in manufacturing. The sawmills and the brick and tile plants, despite their relative decline, still supply an important part of the total manufactures. Eight of the 29 manufacturing establishments were sawmills and four were brick and tile plants.

Principal Industries. Central location in respect to population density, nearness to Indianapolis, and availability of good transportation facilities have been especially significant in stimulating (1) the manufacture of clay products, (2) fish hatcheries, (3) the resort hotel business, and (4) woodworking industries. Agriculture has also profited greatly from this favorable combination of factors. Commercial apple orchards and the production of dairy products are examples where benefits have been considerable.

The development of the clay products industry has been facilitated by the presence of two sizeable outcrops of suitable shales favorably situated in respect to Indianapolis and transportation facilities to Indiana coal.

Sawmilling has depended primarily upon the relative nearness of raw materials. The comparative stability of the lumbering industry has facilitated the furniture and cooperage industries, especially at Martinsville.

The food industries, chiefly milling of wheat and corn and canning of tomatoes, are partly dependent upon the relative suitability of Morgan County's soils, climate, and topography for the production of these crops. As more favorable conditions for processing wheat and corn are found in Indianapolis and in various other parts of Indiana milling is of local importance.

The most unique and probably its most widely known industry

is Morgan County's goldfish hatcheries which are reputedly the largest in the world. The industry originated just northeast of Martinsville where abundant glacial gravels yield large natural springs. Martinsville was also soon discovered to possess climatic conditions approaching the optima for the commercial production of goldfish. Favorable site and climate were much enhanced by central market location and a relatively cheap labor supply.

Agriculture. Notable local contrasts in agriculture are apparent in Morgan County. The almost level glacial plain and the White River Bottoms on the one hand and the rough uplands on the other offer considerable diversity. The important influence of varying degrees of glaciation is admirably exemplified. The abundant glacial drift in the north has meant fine opportunities for agricultural production; in the south, the lack of drift has helped produce a poor area agriculturally. The study of average corn yields for different parts of the County reveals a close correlation between yields and amount of glacial drift.

Agricultural production has been maintained in spite of improper use and damage to soils by erosion. Hybrid corn, the use of fertilizer on some soils, and better farming techniques have increased yields on the more progressive farms. Change in the agricultural scene has come gradually. Since 1930 the increased acreage devoted to soybeans and alfalfa, with a concurrent decrease in wheat and oats acreage, has been significant because the introduction of these crops offers possibilities for greater diversification and better use of soils. Fig. 2 suggests the relative importance of different land uses during a recent decade (1935-44). While decrease in value of cereals has been relatively small, the increased value of hay and forage, vegetables, and fruits is apparent. Further shifts in production away from corn, wheat, and oats appear probable. A pronounced decrease in value of horses and mules reflects the steady increase in farm mechanization. More beef and dairy cattle are produced without an increase in grain production.

Trade and Transportation. The most significant feature of the transportation system of Morgan County is the dominance of the White River Valley. This valley dissects the rough upland making it advantageous for principal routes to follow the valley. Nearness to Indianapolis has given the County two first class state highways radiating out of that city. Two U. S. highways flank the northern and eastern boundaries.

In commercial activities Martinsville dominates most of the

County; the growth of nearby Indianapolis has, however, weakened its status. Mooresville, a secondary center lacks the central position and the convergence of transportation routes that Martinsville possesses.

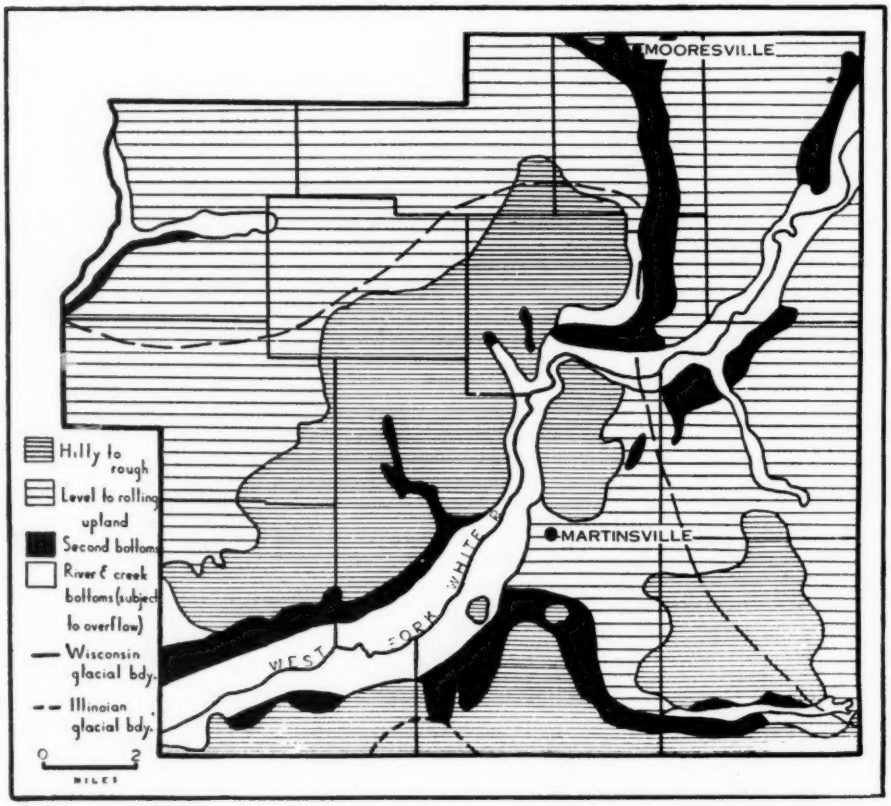


FIG. 2. Land utilization in Morgan County. Based on a 10-year average (1935-44) of acreage devoted to various uses.

SUMMARY

It is probable that the present production pattern will not be altered drastically within the next quarter of a century; however, it is reasonable to assume that nearness to Indianapolis, which is still a growing city, may mean an increase in manufacturing, especially of items requiring specialized labor and few heavy materials. In agriculture a diversification and intensification is probable. Less corn will be grown. Again nearness to Indianapolis is likely to stimulate truck farming and dairying.

MAGNESIUM—THE METAL FOR MOTION

W. O. BLANCHARD
University of Illinois

THE IMPORTANCE OF TRANSPORTATION

One of the most fundamental geographic facts which you and I have come to appreciate is that the world's natural resources are limited in extent and are very unequally distributed. The valuable forests, the important mineral deposits, the worthwhile fisheries and the fertile soils occupy very restricted areas and they are separated from each other by vast relatively unproductive regions. Not even within the boundaries of the *largest nations* are there sufficient quantities of all the materials required by the people residing there. National self sufficiency may be a good political catch phrase but nature has seen to it that in practice it has very definite limitations.

As a consequence of this situation a large part of man's time and energy is expended in moving the world's goods about—shifting them from where they are to where he wants them to be. The problems of transportation form, as we well know, much of the subject matter of our commercial geography.

Improvements in transport have been affected in many ways. One line of attack has been the leveling of the transportation route. Man has drilled tunnels thru obstructing mountains, bridged troublesome rivers, and cut canals across isthmuses. Another group of improvements has focused attention on the power which motivates transport. Human muscle gave way to animals and the wind to steam. Still a third group aimed to reduce the bulk of the goods to be moved so as to eliminate carrying waste material. Ores may be smelted, logs reduced to finished lumber, fruits dehydrated, corn converted to beef or pork, before long distance shipment to market. A fourth type of change of special interest to us has sought to reduce the weight of the carriers themselves. Our ships on the waters and our vehicles on the land, our trains and our planes have all been too heavy. The car you drive weighs from three to five times as much as the passenger load in it and, of course, the greater part of the gas you fed it is used to push that ton of steel; only a small fraction, to move the load.

MAGNESIUM ENTERS THE TRANSPORTATION PICTURE

It is in the reduction of the weight of carriers, as well as that of many tools, machines and appliances, that the light-weight metals aluminum and magnesium fit into the picture. The former has, in the past 60 years, made for itself a very definite place as a

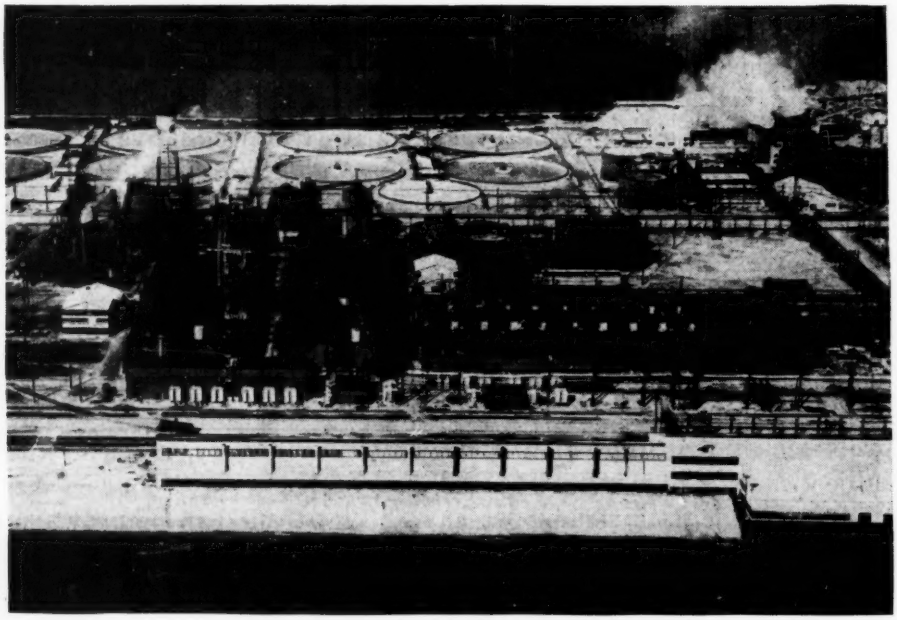


Fig. 1. Aerial view of the Dow Chemical Company magnesium plant at Freeport, Texas. The ten round objects at the left are the Dorr tanks in which the sea water is mixed with slaked lime for the first step in the magnesium process. To the right appears the primary oyster shell storage and the kilns in which the shells are burned to lime. The filters and evaporators where magnesium chloride liquors are concentrated and the cell buildings appear in the foreground of the photograph. Courtesy of The Dow Chemical Company.

construction metal. Magnesium on the other hand is a newcomer with scarcely a decade of experience in which to prove itself. It is still on trial and like the rookie on the team its performance in competition will be watched closely. Let us recount a few of the factors which affect the production of the metal and which point the way toward its place among structural metals.

Known to metallurgists for the past century and a half, magnesium for most of that time was little more than a laboratory

curiosity. Extremely high costs of production automatically eliminated most markets and metal users knew little of its qualities.

Magnesium, like many people, in a state of single blessedness, seemed quite unstable. It was known to have a strong affinity for oxygen and in powder or ribbon form it was about as inflamable

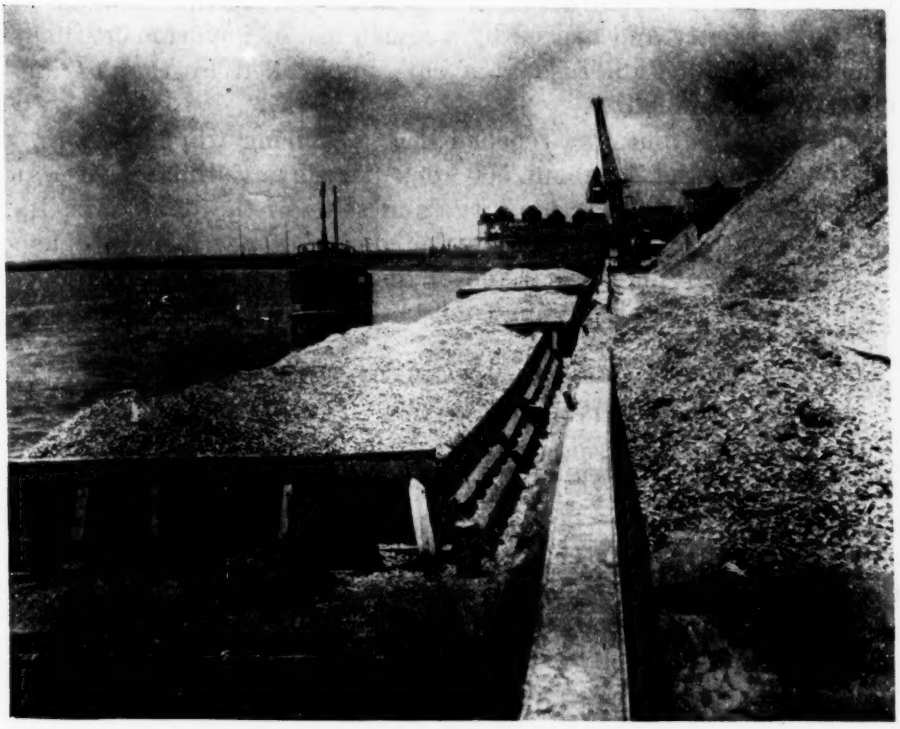


Fig. 2. Tons upon tons of oyster shells, dredged from Galveston Bay, arrive by barge at the sea water plants where they are washed and fed into long cylindrical kilns and burned to lime. The lime, after slaking is mixed with raw sea water and precipitates magnesium hydrate (common milk of magnesia). Courtesy of The Dow Chemical Company.

as gasoline. Photo flash powder in peace and incendiaries in war seemed to be about the limit of its usefulness.

Except for its incendiary use in war time the world took little interest in the metal. Germany, however, conducted extensive research into its possibilities—expecially during the twenty years between World War I and II. Not till 1940 when European skies were already dark with Axis planes did we become aware of that country's extensive use of magnesium in plane construction.

World War Booms Magnesium

With this discovery and with the race for air supremacy on we started a mad rush to locate sources of raw materials, to build plants for producing and fabrication of the metal, to establish research laboratories—in short to do in a few months a job that Germany had worked at for two decades. Under the stimulus of military urgency and backed by a lavish use of government funds American production rose at a rate unparalled by that of any other basic commodity.

The peak output was reached in 1943 during which year production amounted to about 500 tons per day. Estimates of war time needs had been far too large and some of the plant capacity never got into production. With the coming of peace the problem of estimating civilian needs and of disposing of surplus plants is with us—as it is in aluminum, rubber and many other industries.

Magnesium from the Sea

One of the most interesting chapters in the story of magnesium is its production from sea water. The latter contains about one part of the metal in every 800 of water. A bath tub of ocean water contains about four ounces of magnesium. This is far less than in ores or in brines but the reserves in the ocean are unlimited and in a form easily handled.

After a search for possible location along the Atlantic and Gulf coasts, Freeport, Texas, was selected as a site. Here was found an unusual combination of favorable conditions. A peninsula offered access to water on three sides. Waste water from which the metal had been taken could be returned to the ocean seven miles distant so as to not dilute the waters being used. All essential raw materials were within easy reach. Oyster shells dredged from the bottom of the bay were calcined for lime; sulfur and salt were available in nearby deposits; unlimited natural gas was to be had from adjacent fields; a deep channel provided water transport in addition to rail connections. The army provided a market for every pound produced. It was the sort of combination a manufacturer dreams about but rarely finds.

Here the Dow Chemical Company produced in 1941 the initial ingot of magnesium—the first time that a metal had been extracted in commercial quantities from the sea. A cubic mile of ocean water contains over ten times as much of the metal as we produced in our best year. The chemists tell us all of the ninety odd elements are

in the ocean and they estimate that in a cubic mile these items would have a total value of some five billion dollars. However, to our obvious question he shakes his head. Practically all are in such minute quantities that extraction is impracticable.

MAGNESIUM SHIFTS FROM A MILITARY TO A CIVILIAN CAREER

During the war costs were largely ignored. Air supremacy was vital and a difference of a few hundred pounds in weight of planes could easily spell the difference between success and failure. The substitution of magnesium alloy in a single wheel of a bomber saved 100 pounds. With the shift from a military to a civilian career, however, the rules are changed and the newcomer must show he is better than competitors at the same price or be discarded.

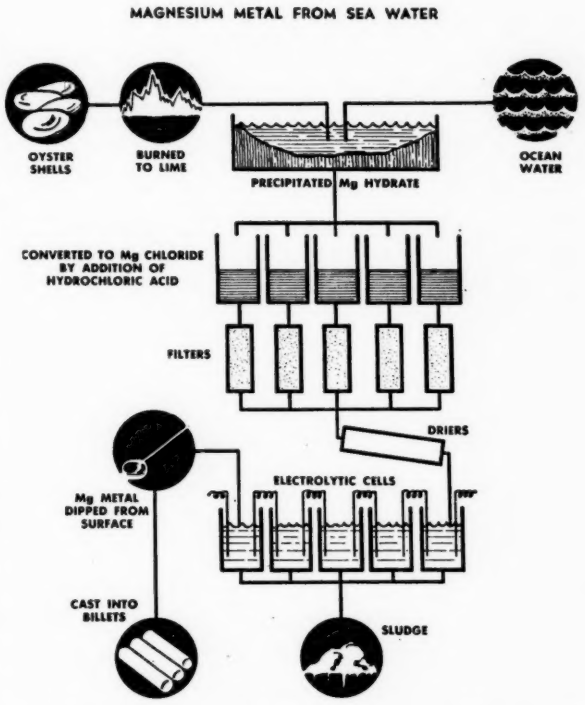


Fig. 3. Diagram showing steps in separating magnesium metal from sea water. Courtesy of the Dow Chemical Company.

CHARACTERISTICS AND SUGGESTIVE USES

In the pure form, magnesium like aluminum, is soft and weak but in the "wedded" state it is at its best. Alloyed with a little aluminum, manganese and zinc it is strong and tough. Its greatest asset is its lightness. It is only two-thirds the weight of aluminum; one-fourth that of steel. Pound for pound it is nineteen times as rigid as steel. Its strength: weight ratio is fair. Obviously its future seems to lie in fields where lightness is all important—in transport carriers, especially airplanes, and in numerous items which have to be moved—portable tools, home and office equipment, machines with movable parts as in textile apparatus. In fact everything which moves and

in which weight is undesirable, if it doesn't require too much strength, can pay a premium for magnesium. Suggestive of its possibilities are wheelbarrows weighing 30 pounds equal in strength to a steel barrow of 85 pounds; a 24′ extension ladder of 31 pounds replaces one of wood weighing 63 pounds; lawn mowers weigh about one half as much as those of steel, etc. Magnesium is an excellent conductor of heat and this, combined with its lightness makes it well suited for kitchen utensils.

At present the chief obstacle to a wider use is price. The pure metal can be produced almost as cheaply as aluminum but fabrication costs are almost three times as high. With the new techniques learned during the war and with mass production methods, prices should be much reduced. However, prices of aluminum, its present competitor are also trending downward.

The search for structural materials which combine lightness, durability, high tensile strength and cheapness is never ending. Magnesium gives promise of occupying a prominent place among non-ferrous metals altho such a position may require a decade or more of research. Metallurgists predict however, that neither of the light metals magnesium nor aluminum will supplant steel as the basic metal of industry.

THE NATIONAL COUNCIL AT WORK

Since the term of office of the President of the National Council terminates at the end of January, this article will conclude the series of organization pages by the present incumbent. Reporting and commenting upon the activities of the officials and committees of the Council have been pleasurable experiences. Yet there are regrets that plans for a more comprehensive survey of the work of the Council during the past year did not materialize. These few remaining lines can hardly be more than sentence summaries of the work of committees:

An extended account of the objectives and functions of the Planning Committee has been given on an earlier organization page. A recent detailed report by the chairman, Mrs. Katheryne T. Whittemore, outlines fifty projects for consideration by the Council. It includes comments made in relation to these by Council officials reviewing an earlier draft. One of the projects—Proposal for Committee on Color Transparencies—has already advanced to the promotion stage. Details of the project have been submitted by mail to the Executive Board, which has approved same.

The Publications Committee has been organized to plan a publications program, to review manuscripts submitted and to make recommendations thereon to the Executive Board, and to review requests for grants-in-aid from the Publications Fund for publications of material in geographic education. Miss M. Melvina Svec, the chairman, has listed some of the types of publications considered, problems involved, costs for different types of printing, etc.

Several members of the Committee on Geographic Education for World Understanding have had various conference contacts with educational agencies, such as the United Nations Educational Scientific and Cultural Organization and the National Education Association. Both the chairman, Sidman P. Poole, and the secretary, Mrs. Erna Grassmuck Gilland, report enthusiastic audiences with respect to geographic education promotion programs as they fit into the general objectives of the national and international education programs. It is hoped that the National Council will find a way of meeting the suggestion that the NEA and the NCGT jointly sponsor a publication to show the part that geography education plays in world understanding.

At the request of Clyde F. Kohn, editor of the 1948 Yearbook of the National Council of the Social Studies on Geography, a Yearbook Committee was appointed to act in an advisory capacity. A large number of chapter contributions to the Yearbook appear as papers on the Charlottesville program. Mrs. Katheryne T. Whittemore, the chairman, reports the committee as favoring the continuance of the committee until the Yearbook is completed.

The Council several years ago approved the recommendation of the Committee on Standards of Certification for the Teaching of Geography in High Schools for the appointment of a High School Geography Curriculum Committee. Such a committee was subsequently appointed. At the Executive Board meeting at Columbus last year it was suggested that the work of this committee be expedited by the republication of pertinent material already published in the JOURNAL. The chairman, Miss Zoe A. Thralls, has turned in an outline for the contents of this proposed unit as one of the Council's Geographic Education Series. Miss Thralls in another connection has served as a committee of one to answer various inquiries directed to the Council.

The Aviation Geography Committee, of which Dr. R. L. Tuthill is chairman, reports the preparation of bibliographies of materials on aviation available from commercial airline companies and other sources.

David J. Swartz, as Director of Public Relations, reports the compilation of an up-to-date mailing list to expedite Council releases. He suggests among other things

the preparation of a list of state executives as soon as possible to aid releases of prepared articles on geography for local papers.

Last year Mrs. Katheryne T. Whittemore pointed to the desirability of having a Council seal. A committee was set up with Loyal Durand, Jr. as chairman. Thirty-five designs have been submitted and reviewed, one of which is being recommended for adoption by the Council.

The President of the Council has been requested during the past year to set up special committees to award prizes to contributors of the most outstanding articles to the JOURNAL in four different divisions of geography, during a recent five-year period. The prizes are contributed by an anonymous donor to honor editors of the JOURNAL and other leaders in the geographic field. So far two prizes have been awarded: The Richard Elwood Dodge Prize to Dr. Otis W. Freeman for his article "The Pacific Island World," and the Ray Hughes Whitbeck Prize to Dr. Bruno Lasker for his article "Mineral Resources of Southeast Asia."

Two more prizes are in the offing: The J. Paul Goode Prize, and the George J. Miller Prize. The jury of each award is made up of the President, the First Vice-president, the Second Vice-president of the Council and two associate editors of the JOURNAL to be selected by the President.

ALFRED H. MEYER, *President*

EDITORIAL NOTES AND NEWS

The JOURNAL OF GEOGRAPHY is again pleased to announce 1948 prizes to honor Dr. A. E. Parkins and Dr. Ellsworth Huntington. The prize named in honor of Dr. Parkins is to be for an article published in the JOURNAL within the last decade on the subject of conservation or some study of the South. The prize named in honor of Dr. Ellsworth Huntington is for an article or series on Eurasia, or on climate, and published in the JOURNAL within the last decade. Both Dr. Huntington and Dr. Parkins received the Distinguished Service Award from the National Council of Geography Teachers. Each served as president of the Association of American Geographers and Dr. Parkins also served as president of the National Council of Geography Teachers. He was also one of the editors of the textbook "Our Natural Resources and Their Conservation," half of the royalties on the sales of which went to the National Council of Geography Teachers and half to the Association of American Geographers. Both Dr. Huntington and Dr. Parkins were frequent contributors to the JOURNAL. As readers of the JOURNAL are aware, these prizes have been made by an anonymous donor with the thought of promoting geographic education in America.

H. BOWMAN HAWKES informs us that a new department of geography has been set up at the University of Utah. The department is a unit of the Division of Earth Sciences in a newly organized School of Mines and Mineral Industries. Mr. Hawkes becomes the first Professor of Geography in the new department. The JOURNAL extends to him and to the University its congratulations and best wishes for a successful growth.

WELLINGTON D. JONES, professor emeritus at the University of Chicago, recently spent two weeks with the Department of Geography at Syracuse University. His principal talks centered around the subject of "What Geographers Need to Know About Soils and Associated Land Use."

On Friday, November 15, a conference was held for geography instructors within the service area of the West Chester Pennsylvania State Teachers College under the direction of Miss Harriet A. Elliott, head of the geography department. Dean Winfield W. Menhennett extended the greetings of President Charls S. Swope who was unable to attend. After the introductory remarks by members of the college staff on the purpose and philosophy of modern geographic training, a general session of discussion was held to consider problems and methods of classroom teaching. Preliminary steps to organize a local council of geography teachers were taken with the appointment of William J. Wunsche, of Ridley Park High School, as temporary chairman in charge of organization.

It is reported that almost 78 million gross tons of iron ore were shipped out of Duluth during 1947. This is a peacetime record for ore shipment on Great Lakes vessels, as compared with a little over 65 million tons in 1929. The all-time war record was a little more than 92 million tons in 1942.

GEOGRAPHICAL PUBLICATIONS

James C. Malin. **The Grassland of North America.** 1541 University Drive, Lawrence, Kan., 1947, pp. 402, $3.00.

This volume is by a professor of history of the University of Kansas who has studied the grassland for many decades, often with a distinctly geographic approach. In addition to a useful summary of numerous aspects of the grassland, North Dakota to Texas especially, there are extensive references to the literature (62 pp.) and to the available maps. Of special interest to geographers are the eleven chapters on "historiography." Discussed there are the communications revolution, pioneering toward grassland equilibrium, with some pages on the work of each of a dozen leaders, including N. S. Shaler, J. W. Powell, H. L. Shantz and Isaiah Bowman. Soil physics and tillage are discussed in a chapter. Twenty pages are devoted to Webb, the chief writer on the regionalism of the Great Plains. Other chapters deal with studies of population, agriculture, land tenure, cities, and the harmonization of culture. An appendix is devoted to grassland map studies.

Teachers of regional geography of the United States will find much factual material summarized in this book, many helpful references to literature, and numerous thought-provoking deductions. All geographers who study this book will find their breadth of view enhanced.

Indiana University STEPHEN S. VISHER

J. B. Caldwell. **Introducing Alaska.** 202 pp., G. P. Putnam Sons, New York, 1947, $3.75.

The stated purpose of the author is to give detailed information to individuals who plan a hunting, fishing, or sightseeing trip to Alaska or are interested in the commercial possibilities of its timber, minerals and metals, fish, furs, industrial development, or farming and ranching. He has attempted to analyze both the opportunities and the drawbacks pertaining to activity in the Territory. The objective has been accomplished as well as could be expected in as brief a publication.

Perhaps the greatest single value of the publication is the compilation accomplished. Although there is little in the volume not readily available in other publications, Mr. Caldwell has condensed a variety and volume of material into one small publication. The author understandably falls short of presenting an overall picture of Alaska and Alaskans. For instance, the large proportion of Indians and Eskimos in the population and its problems is hardly mentioned.

Apparently the material has been carefully checked for accuracy of individual statements. However, inasmuch as the work is not documented, it is difficult to check the sources of some of the facts which might be questioned. The author has spent some time in Alaska during the past decade. The publication has been favorably commented on by a number of prominent Alaskan business men and government agents.

The material is written in a simple, matter-of-fact vein. The syntax is influenced somewhat by that of the various source materials and flavored by original statements of interesting facts, ideas and advice by the author, some of which may not otherwise be readily available.

The first chapter, "General Information," is understandably weak. This apparently results largely from the inclusion of so many items in a limited space. From the somewhat inadequate treatment in this chapter, the reader may draw some erroneous conclusions.

This publication may satisfy to a considerable degree the increasing interest of people about Alaska. The reader whose interest is casual rather than academic may find it sufficient for his needs. An index and a better reference map would add to the value of the work. The pictures are large, very good, and adequately support the general theme. The data may rapidly be outdated because of the inclusion of details pertaining to current regulations, laws, prices and similar information.

OVID MILLER MCMILLION

Wilson Teachers College
Washington, D.C.